FlyBy Math™ Alignment
North Dakota Mathematics Content and Achievement Standards
April 2005

Standard 1: Number and Operation
Students understand and use basic and advanced concepts of number and number systems.

COMPUTATIONAL FLUENCY AND ESTIMATION

Benchmark Expectations	***FlyBy Math*™ Activities**
9-10.1.8. Apply estimation skills to predict realistic solutions to problems.	--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios. --Predict outcomes and explain results of mathematical models and experiments.
9-10.1.10. Explain the reasonableness of a problem's solution and the process used to obtain it.	--Explain and justify solutions regarding the motion of two airplanes using the results of plotting points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system.

Standard 2: Geometry and Spatial Sense
Student understands and applies geometric concepts and spatial relationships to represent and solve problems in mathematical and nonmathematical situations.

COORDINATE GEOMETRY

Benchmark Expectations	***FlyBy Math*™ Activities**
9-10.2.5. Use Cartesian coordinates to determine distance, midpoint, and slope.	--Interpret the slope of a line in the context of a distance-rate-time problem.

VISUALIZATION, SPATIAL REASONING, AND GEOMETRIC MODELING

Benchmark Expectations	***FlyBy Math*™ Activities**
9-10.2.11. Use geometric models to find solutions to problems in mathematics and other disciplines; e.g., art and architecture.	--Apply mathematics to predict and analyze aircraft conflicts and validate through experimentation. --Plot points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system to describe the motion of two airplanes.

Standard 3: Data Analysis, Statistics and Probability
Students use data collection and analysis techniques, statistical methods, and probability to solve problems.

DATA COLLECTION, DISPLAY, AND INTERPRETATION

Benchmark Expectations	***FlyBy Math*™ Activities**
9-10.3.1. Construct appropriate displays of given data;	--Choose among tables, bar graphs, line graphs, a

i.e., circle graphs, bar graphs, histograms, stem-and-leaf plots, box-and-whisker plots, and scatter plots.	Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes.
9-10.3.2. Interpret a given visual representation (i.e., circle graphs, bar graphs, histograms, stem-and-leaf plots, box-and-whisker plots, and scatter plots) of a set of data.	--Use tables, bar graphs, line graphs, equations, and a Cartesian coordinate system to draw conclusions.

Standard 4: Measurement

Students use concepts and tools of measurement to describe and quantify the world.

MEASURABLE ATTRIBUTES, MEASUREMENT SYSTEMS AND UNITS

Benchmark Expectations	***FlyBy Math™* Activities**
9-10.4.1. Select appropriate units and scales for problem situations involving measurement.	--Calculate and measure the position and time of simulated aircraft. Represent that motion using tables, graphs, equations, and experimentation.

MEASUREMENT TOOLS, TECHNIQUES, AND FORMULAS

Benchmark Expectations	***FlyBy Math™* Activities**
9-10.4.6. Employ estimation techniques to evaluate reasonableness of results in measurement situations.	---Predict outcomes and explain results of mathematical models and experiments.

Standard 5: Algebra, Functions and Patterns

Students use algebraic concepts, functions, patterns, and relationships to solve problems.

PATTERNS, RELATIONS, AND FUNCTIONS

Benchmark Expectations	***FlyBy Math™* Activities**
9-10.5.2. Express relations and functions using a variety of representations; i.e., numeric, graphic, symbolic, and verbal.	--Represent distance, speed, and time relationships for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system.

NUMERIC AND ALGEBRAIC REPRESENTATIONS

Benchmark Expectations	***FlyBy Math™* Activities**
9-10.5.7. Use algebraic expressions, equations, or inequalities involving one or two variables to represent relationships (e.g., given a verbal statement, write an equivalent algebraic expression or equation) found in various contexts (e.g., time and distance problems, mixture problems).	--Represent distance, speed, and time relationships for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system. --Use tables, graphs, and equations to solve aircraft conflict problems.
9-10.5.9. Solve linear equations and inequalities, systems of two linear equations or inequalities, and quadratic equations having rational solutions; e.g., factoring, quadratic formula.	--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios. --Represent distance, speed, and time relationships for constant speed cases using linear equations and a Cartesian coordinate system.

	--Use graphs to compare airspace scenarios for both the same and different starting conditions and the same and different constant (fixed) rates.
MATHEMATICAL MODELING	
Benchmark Expectations 9-10.5.13. Interpret a graphical representation of a real-world situation.	***FlyBy Math™* Activities** --Represent distance, speed, and time relationships for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system. --Interpret the slope of a line in the context of a distance-rate-time problem.
9-10.5.14. Draw conclusions about a situation being modeled.	--Use tables, bar graphs, line graphs, equations, and a Cartesian coordinate system to draw conclusions.
RATES OF CHANGE	
Benchmark Expectations 9-10.5.15. Approximate and interpret rates of change from graphical and numerical data	***FlyBy Math™* Activities** --Represent distance, speed, and time relationships for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system. --Use graphs to compare airspace scenarios for both the same and different starting conditions and the same and different constant (fixed) rates. --Interpret the slope of a line in the context of a distance-rate-time problem.